



FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 330.00

Complete if Known

Application Number	10/087,742-Conf. #7012
Filing Date	March 5, 2002
First Named Inventor	Hidekiyo Takaoka
Examiner Name	S. Ip
Art Unit	1742
Attorney Docket No.	M1071.1711/P1711

METHOD OF PAYMENT (check all that apply)

☐ Check ☒ Credit Card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit
Account
Number

50-2215

Deposit
Account
Name

Dickstein Shapiro Morin &
Oshinsky LLP

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) (\$) 0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims -20** = x =
Independent Claims -3** = x =
Multiple Dependent =

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1202	18	2202	9	Claims in excess of 20	
1201	86	2201	43	Independent claims in excess of 3	
1203	290	2203	145	Multiple dependent claim, if not paid	
1204	86	2204	43	** Reissue independent claims over original patent	
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) (\$) 0.00

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for <i>ex parte</i> reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330.00
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 330.00

SUBMITTED BY

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Edward A. Meilman

Date

August 2, 2004

**TRANSMITTAL OF APPEAL BRIEF**Docket No.
M1071.1711/P1711

In re Application of: Hidekiyo Takaoka et al.

Application No.
10/087,742-Conf. #7012Filing Date
March 5, 2002Examiner
S. IpGroup Art Unit
1742

Invention: LEAD FREE SOLDER AND SOLDERED ARTICLE

TO THE COMMISSIONER OF PATENTS:Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed: June 1, 2004.The fee for filing this Appeal Brief is 330.00.☒ Large Entity ☐ Small Entity☐ A check in the amount of _____ is enclosed.☐ Charge the amount of the fee to Deposit Account No. _____.
This sheet is submitted in duplicate.☒ Payment by credit card. Form PTO-2038 is attached.☒ The Director is hereby authorized to charge any additional fees that may be required or credit any overpayment to Deposit Account No. 50-2215.
This sheet is submitted in duplicate.Edward A. Meilman
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(212) 896-5471Dated: August 2, 2004



AF/1742
✓ IFW

Docket No.: M1071.1711/P1711
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Hidekiyo Takaoka et al.

Application No.: 10/087,742

Filed: March 5, 2002

Art Unit: 1742

For: LEAD FREE SOLDER AND SOLDERED
ARTICLE

Examiner: S. Ip

APPELLANT'S BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This brief is in furtherance of the Notice of Appeal, filed in this case on June 1, 2004. It is transmitted in triplicate and contains items under the following headings as required by 37 C.F.R. § 1.192 and M.P.E.P. § 1206:

- I. Real Party In Interest
- II Related Appeals and Interferences
- III. Status of Claims
- IV. Status of Amendments
- V. Summary of Invention
- VI. Issues
- VII. Grouping of Claims
- VIII. Arguments
- IX. Claims Involved in the Appeal
- Appendix A Claims

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is Murata Manufacturing Co., Ltd.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

There are 6 claims pending in application. All are the subject of this appeal. No claims have been cancelled during prosecution.

IV. STATUS OF AMENDMENTS

All proposed amendment during prosecution have been entered.

V. SUMMARY OF INVENTION

Solders have conventionally been composed of tin and lead but in consideration of the environment, solders which are lead free have been developed. However, soldered articles using lead free solders which mainly contain tin invite electrode (conductor) leaching upon soldering. In addition, the tin diffuses into the conductor where the articles are left at high temperatures or are subjected to heat aging, which results in a deterioration of the electrical characteristics and the mechanical characteristics of the electronic devices and electronic parts containing such conductors.

The present invention is based on the discovery that by appropriately limiting the elemental composition of the solder and the amounts of the elements employed, resistance to conductor leeching upon soldering or upon heat aging after soldering can be realized and the resulting electronic devices and parts have their characteristics deteriorated to a lesser degree. The solder contains 0.5 to 1% by weight of copper and at least 90.5% of tin and contains at least one of cobalt, iron, manganese and palladium in specified amounts.

VI. ISSUES

Whether the claims are obvious under 35 U.S.C. § 103 over JP 2000190090 (hereinafter JP '090) or Carey (U.S. 6,080,497), each of the these references being considered individually.

VII. GROUPING OF CLAIMS

The claims do not stand and fall together and arguments supporting the separate patentability of each claim group as required by M.P.E.P. § 1206 are presented in the next section.

VIII. ARGUMENTS

The invention about which this appeal is concerned with a lead free solder and a soldered article using that solder. By appropriately selecting the components in the solder and the amounts of the components, the appellants determined that the solder and the resulting soldered article were more resistant to electrode leeching upon soldering or upon heat agent after soldering and thereby resisted deterioration. A problem with the lead free solders mainly containing tin of the prior art is that they invite

amount of bismuth and/or indium is less than 1% by weight, the effect of lower the melting point of the copper-tin solder will not be realized (translation paragraph 0013).

In addition, small amounts of nickel, germanium, palladium, gold, titanium or iron can be added into the bismuth and/or indium containing solder (translation paragraphs 0011). While the reference teaches that small amounts of nickel, etc., can be added to the bismuth and/or tin solder, there is no teaching about the effect, if any, that these other elements may have if added to a copper-tin solder which does not contain the bismuth and/or indium.

JP '090 thus teaches a solder alloy which must include bismuth and indium as essential components. Neither are employed in the present invention. The claims on appeal are "consisting essentially" claims and JP '090 teaches that Bi and In alter a basic characteristic of the solder. Hence, both are excluded from the scope of the appealed claims. There is no teaching or suggestion that either the bismuth or the indium can be eliminated nor is there a motivation to do so. Accordingly, the Japanese reference cannot render the claimed invention obvious.

The Examiner has sought to avoid the foregoing by noting that "the instant specification does not exclude Bi (see pages 8-9 of the instant specification)." That is a misreading of what was said. The issue is what the claims cover, and not what the specification discloses. This is particularly pertinent here where, as noted above, the specification discloses a number of different solders but not all are being claimed in this application. The claims under consideration exclude Bi.

electrode (conductor) leeching upon soldering and the tin diffuses into the conductors when the articles are left at high temperatures or heat aged.

The application text discloses three (3) solder compositions. However, the claims on appeal are limited to one of those solders and its use. The other two solders have been made the subject of other applications since the prior art considerations applicable thereto is different from the prior art considerations relied on by the Examiner in this case.

More particularly, the claims on appeal relate to a lead free solder containing at least one member of the group of 0.1-1% (preferably 0.4-0.5%) cobalt, 0.01-0.2% (preferably 0.05-0.1%) of iron, 0.01 to 0.2% (preferably 0.05-0.1%) of manganese and 0.01-0.2% (preferably 0.4-0.6%) of palladium; 0.5 to 1% of copper and at least 90.5% of tin. The appealed claims also relate to a soldered article containing a transition metal conductor and being joined through the solder.

1. JP '090 Does Not Render The Claimed Invention Obvious

JP '090 teaches that copper-tin, antimony-tin and silver-tin lead free solders are known but suffer from the disadvantage that their melting temperature is too high (translation paragraph 0005). In order to lower the melting point of a solder containing only copper and tin, as well as raise its mechanical strength and lessen heat damage to electronic parts at the time of soldering, the reference teaches the addition of bismuth and/or indium to the solder. In addition, small amounts of nickel, germanium, palladium, gold, titanium or iron can be added into the bismuth and/or indium containing solder (translation paragraph 0010). JP '090 teaches that if the

With respect to appealed claims 2 and 3, while the Japanese reference generally refers to soldering, there is no disclosure in the reference of using any of the solders there disclosed in connection with a transition metal conductor which is liable to spread in molten tin nor a solder in which the transition metal conductor is at least one of Cu, Ag, Ni, Au, Pd, Pt, Zn or alloys thereof.

Clearly, JP '090 does not render the claimed invention obvious.

2. Carey Does Not Render The Claimed Invention Obvious

The Carey patent relates to corrosion resistant copper metal coated with an alloy of tin which can contain as little as 75% tin (col. 23, line 25), although the preferable amount is apparently at least 90%.

The description of Carey's tin alloy composition is set forth in cols. 27 to 30. Those tin alloys contain tin and one or more of fourteen (14) elements, one of which is even lead! None of the specific tin alloys described in the patent fall within the scope of the instant claims. The apparently preferred compositions (col. 30, lines 6-29) do not contain copper.

There are many millions of combinations that fall within the scope of the Carey disclosure, even before considering amount of each element. Even if one were by accident to choose the elements of the instant claims, amounts outside the ranges in the appealed claims could be chosen.

For instance, iron could be present in excess of the 0.2% by weight maximum of the instant claims. The Carey disclosure thus includes tens of millions, if not hundreds of millions, of compositions outside the scope of the claims under consideration here. To realize a composition having the same elements and amounts as the instant claims, even by accident, would be serendipity.

To overcome this deficiency in Carey, the Examiner has taken the position that the “disclosed genius would have rendered the species prima facie obvious” and has cited that some cases involving as few as four (4) possibilities (Final Rejection, page 4). However, the Federal Circuit has recently pointed out that a disclosure of millions of compounds does not render a claim to a small number of compounds obvious. *In re Baird*, 29 USPQ2d 1550 (Fed. Cir. 1994). “The fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious.” *Id.* at 1552. The cases cited by the Examiner in support of a contrary position, to the extent relevant, are not to the contrary as they involve references in which the number of possibilities was much more limited. The Examiner has not pointed to that something more which *Baird* requires.

It is well established that a shotgun disclosure (as in Carey) is insufficient to render an invention such as claimed here obvious. As stated by the CCPA in *In re Luvisi*, 144 USPQ 646 (1965), quoting an earlier Board of Appeals decision,

The likelihood of producing a composition such as here claimed from a disclosure such as shown by the ...patent would be about the same as the likelihood of discovering the combination of a safe from a mere inspection of the dials thereof. (emphasis by the Board)

The Carey disclosure of many millions of possibilities is, at the very best, an invitation to experiment, without any disclosure which suggests the lead free tin solder claimed in this application.

There is clearly no motivation to manipulate the Carey disclosure to realize the claimed solder. There is no guidance about which elements to select and which to ignore, or how to adjust concentrations. With particular reference to appealed claims 5 and 6, there is no suggestion to pick only one member of the group.

Clearly, Carey does not render the claimed invention obvious.

IX. CLAIMS INVOLVED IN THE APPEAL

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

Dated: July 30, 2004

Respectfully submitted,

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/087,742

1. A lead-free solder consisting essentially of:
 - at least one selected from the group consisting of 0.01 to 1% by weight of Co, 0.01 to 0.2% by weight of Fe, 0.01 to 0.2% by weight of Mn, and 0.01 to 2% by weight of Pd;
 - 0.5 to 1% by weight of Cu; and
 - 90.5% by weight or more of Sn.
2. A soldered article comprising an article containing a transition metal conductor and being joined through a solder, said transition metal conductor being liable to spread in molten Sn, wherein said solder is a lead free solder according to claim 1.
3. A soldered article according to claim 2, wherein said transition metal conductor comprises at least one selected from elementary substances or alloys thereof of the group consisting of Cu, Ag, Ni, Au, Pd, Pt and Zn.
4. A lead-free solder according to claim 1, consisting essentially of:
 - at least one selected from the group consisting of 0.4 to 0.5% by weight of Co, 0.05 to 0.1% by weight of Fe, 0.05 to 0.1% by weight of Mn, and 0.4 to 0.6% by weight of Pd;
 - 0.5 to 1% by weight of Cu; and

90.5% by weight or more of Sn.

5. A lead-free solder according to claim 4 containing only one member of said group.

6. A lead-free solder according to claim 1 containing only one member of said group.